**MGE UPS SYSTEMS**

## AmpMeter PDU

## Installation and user manual

THE UNINTERRUPTIBLE POWER PROVIDER

**MGE**
UPS SYSTEMS
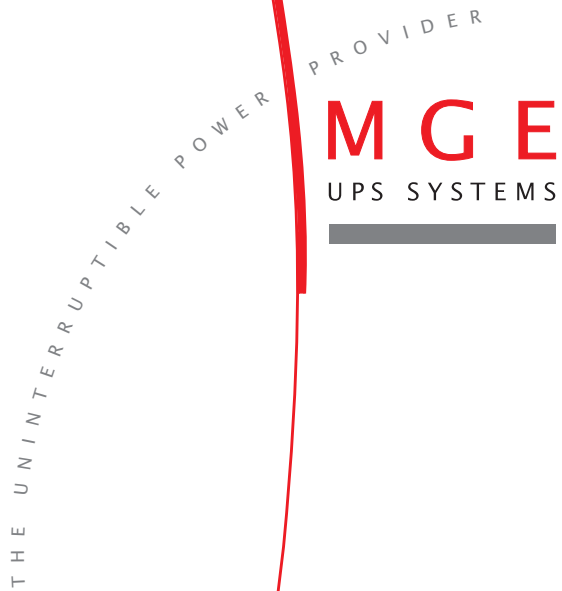
**Instructions**
This symbol is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

**Dangerous Voltage**
This symbol is intended to alert the user to the presence of un-insulated dangerous voltage within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.

**Protective Grounding Terminal**
This symbol indicates a terminal that must be connected to earth ground prior to making any other connections to the equipment.

**Life-Support Policy**

As a general policy, MGE UPS SYSTEMS does not recommend the use of any of its products in the following situations:

- life-support applications where failure or malfunction of the MGE UPS SYSTEMS product can be reasonably expected to cause failure of the life-support device or to significantly affect its safety or effectiveness.
- direct patient care.

MGE UPS SYSTEMS will not knowingly sell its products for use in such applications unless it receives in writing assurances satisfactory to MGE UPS SYSTEMS that:

- the risks of injury or damage have been minimized,
- the customer assumes all such risks, and
- the liability of MGE UPS SYSTEMS is adequately protected under the circumstances.

The term life-support device includes but is not limited to neonatal oxygen analyzers, nerve stimulators (whether used for anesthesia, pain relief or other purposes), auto-transfusion devices, blood pumps, defibrillators, arrhythmia detectors and alarms, pacemakers, hemodialysis systems, peritoneal dialysis systems, neonatal ventilator incubators, ventilators (for adults or infants), anesthesia ventilators, infusion pumps, and any other devices designated as "critical" by the U.S. FDA.

**Compliance**

Units have been safety tested/certified to the following standards: USA and Canada to
UL 60950-1:2003 and CAN/CSA 22.2 No. 60950-1-03, European Union to EN60950-1:2001

USA Notification

Warning: Changes or modifications to these units not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment under FCC rules.

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules.  These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment.  This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications.  Operation of this equipment is a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Canadian Notification

This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la classe A prescrites dans le Règlement sur le brouillage radioélectrique édicté par le Ministère des Communications du Canada.

Japanese Notification

この装置は、情報処理装置等電波障害自主規制協議会（ＶＣＣＩ）の基準に基づくクラ

スA情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことが

あります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。

# Contents

# 1. Getting Started

## Quick Start Guide

The following instructions will help you quickly install and configure your AmpMeter PDU for use on your network.  For detailed information on each step, go to the page number listed to the right.

**For your network security, MGE UPS SYSTEMS strongly recommends the removal of the predefined user account prior to attachment to your network.**

# 2. Installation

Before installation, refer to the following lists to ensure that you have all the items shipped with the unit as well as all other required items.

## Standard Accessories

- Mounting hardware - two removable flanges with four M4 screws and two mounting L-brackets with nut plates and four sets of screws and washers.

For remote monitoring units only:

- RJ45 to RJ45 crossover cable
- RJ45 to DB9F serial port adapter (for connection to standard DB9M DTE serial port)

## Additional Required Items

- Phillip screwdriver
- Screws, washers and nuts to attach the unit to your rack

## Equipment Overview

- The Input Current LED(s) displays the current load for each infeed or electrical phase per infeed.
- Each Branch Circuit / electrical phase is color-coded for easy identification.
- The power inlet/cord(s) connects the PDU to the electrical power source.
- Two RJ45 connectors for Serial (RS-232) and Ethernet connection (remote monitoring units only).
- Two mini RJ11 connectors for Temperature/Humidity sensors (remote monitoring units only).
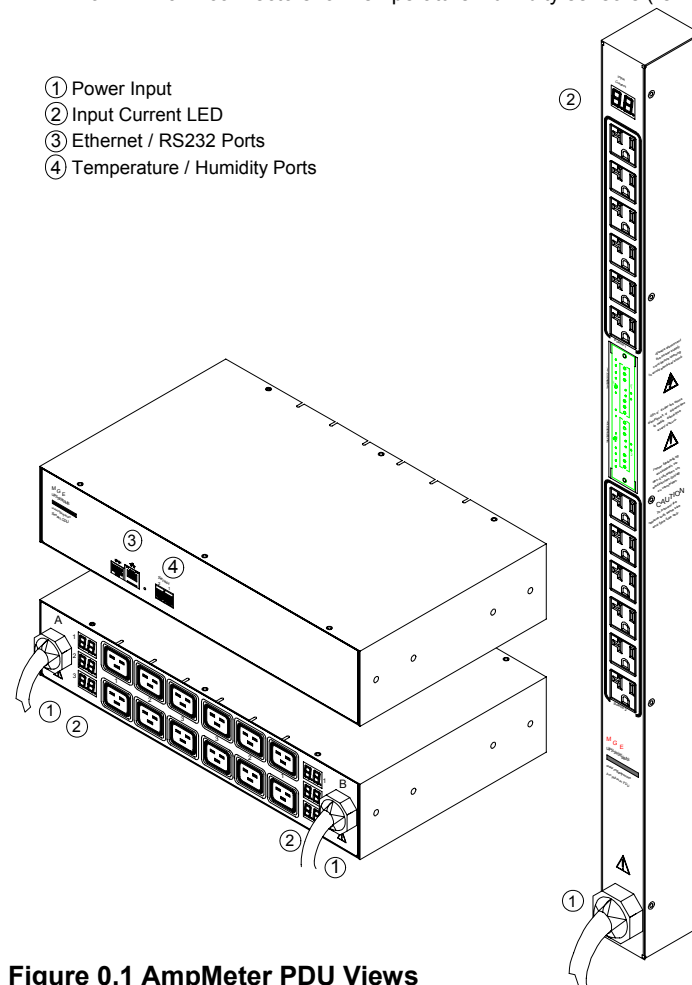
① Power Input
② Input Current LED
③ Ethernet / RS232 Ports
④ Temperature / Humidity Ports

**Figure 0.1 AmpMeter PDU Views**

# 2. Installation

## Safety Precautions

This section contains important safety and regulatory information that should be reviewed before installation and use. For input and output current ratings, see *Power* Ratings in Technical Specifications.

| | | |
|---|---|---|
| Only for installation and use in a Restricted Access Location in accordance with the following installation and use instructions. | *Seulement pour l'installation et l'utilisation dans une Zone Interdite conformément aux installations et l'utilisation des indications suivants.* | Nur zur Installation und Verwendung in einem Sicherheitsbereich gemäß den folgenden Installations- und Verwendungsanleitungen. |
| This equipment is designed to be installed on a dedicated circuit. | *Cet équipement est conçu à être installé sur un circuit spécialisé.* | Diese Ausrüstung ist zur Installation in einem festen Stromkreis vorgesehen. |
| Dedicated branch circuit must have circuit breaker or fuse protection; 3-phase/multi-pole dedicated branch circuits must have circuit breaker or fuse protection for each phase/pole located together. PDUs have been designed without a master circuit breaker or fuse to avoid becoming a single point of failure. It is the customer's responsibility to provide adequate protection for the dedicated branch power circuit. Protection should not exceed the Total Input Rating of the PDU and must meet all applicable local, state and federal codes and regulations. | *Le circuit de dérivation spécialisé doit être équipé de disjoncteurs ou de fusibles ; Lorsqu'ils sont triphasés ou multipolaires, ils doivent être équipés de disjoncteurs ou de fusibles sur chaque phase ou pôle. Les PDU ont été conçus sans disjoncteur ou fusible principal afin de ne pas constituer le seul point de rupture. Le client est seul responsable de la protection des circuits électriques de dérivation spécialisés. Cette protection ne doit pas excéder la consommation totale en entrée du PDU et doit être conforme aux normes et à la réglementation locales, d'état et fédérales.* | Der als Standleitung verwendete Zweigstromkreis muss mit einem Überlastschalter bzw. einer Sicherung ausgestattet sein; bei Standleitungs-Zweigstromkreisen mit 3 Phasen/mehreren Polen müssen zusammengehörige Phasen/Pole individuell durch einen Überlastschalter bzw. eine Sicherung geschützt sein. In PDUs ist kein Haupt-Überlastschalter bzw. keine Hauptsicherung installiert. Dadurch wird ausgeschlossen, dass die PDU als alleinige Schwachstelle in Frage kommt. Es liegt in der Verantwortung des Kunden, den als Standleitung verwendeten Zweigstromkreis durch entsprechende Schutzmaßnahmen vor Überlastung zu schützen. Der Wert für den Überlastschutz darf nicht über dem Wert für die Eingangsstromstärke der PDU liegen und muss geltenden örtlichen und staatlichen Bestimmungen entsprechen. |
| The plug on the power supply cord shall be installed near the equipment and shall be easily accessible. | *La prise sur le cordon d'alimentation sera installée près de l'équipement et sera facilement disponible.* | Der Stecker des Netzkabels muss in der Nähe der Ausrüstung installiert werden und leicht zugänglich sein. |
| Always disconnect the power supply cord before opening to avoid electrical shock. | *Toujours déconnecter le cordon d'alimentation avant d'ouvrir pour éviter un choque électrique.* | Ziehen Sie vor dem Öffnen immer das Netzkabel heraus, um die Gefahr eines elektrischen Schlags zu vermeiden. |
| WARNING! High leakage current! Earth connection is essential before connecting supply! | *ATTENTION ! Haut fuite très possible ! Une connection de masse est essentielle avant de connecter l'alimentation !* | ACHTUNG! Hoher Ableitstrom! Ein Erdungsanschluss ist vor dem Einschalten der Stromzufuhr erforderlich! |

## Installing the Power Input Retention Bracket

For Switched PDUs with a total maximum output <30A, it may be necessary to install the power input retention bracket prior to mounting the Switched PDU within the rack.

**To install the power input retention bracket:**

1. Remove the two screws attaching the IEC 60320 C19 inlet to the enclosure.
2. Assemble and attach the retention bracket to the enclosure as shown.
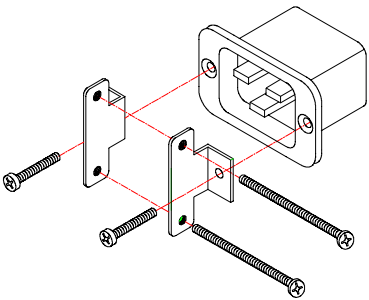


**Figure 2. Retention Bracket assembly**
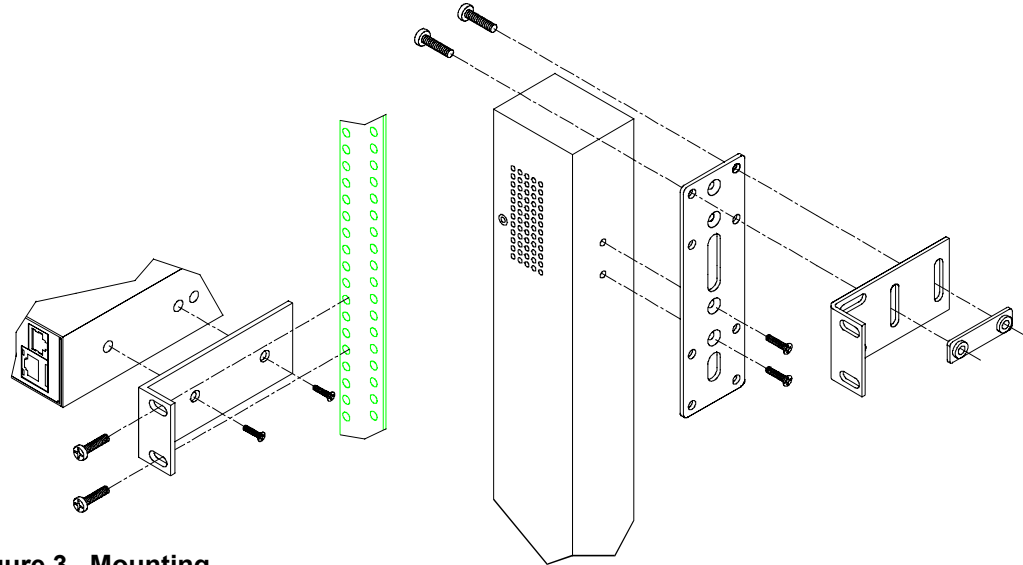
## Mounting



**Figure 3. Mounting**

### Horizontal/Rack

1. Select the appropriate bracket mounting points for proper mounting depth within the rack.
2. Attach the brackets to these mounting points with two screws for each bracket.
3. Install the enclosure into your rack, using the slots in each bracket. The slots allow about ¼ inch of horizontal adaptability to align with the mounting holes of your rack.

### Vertical/Tower

1. Attach the removable flanges to the mount points on the rear of the enclosure using M4 screws.
2. Attach the mounting L-brackets to the flanges with the supplied screws, washers and nut plates. The slots allow about 1½ inches of vertical adaptability.
3. Attach the top and bottom brackets to your rack.

## Connecting to the Power Source

**To attach a power cord to the unit:**

1. Plug the female end of the power cord firmly into its connector at the base.
2. Use a screwdriver to tighten the two screws on the retention bracket.

**To connect to the power source:**

Plug the male end of the power cord into the AC power source.

# 2. Installation

## Connecting Devices

**To avoid the possibility of noise due to arcing:**

1. Keep the device's on/off switch in the off position until after it is plugged into the outlet.
2. Connect devices to the outlets.
   On 230V units, install a retention clip for each outlet; Pull the prongs out slightly and insert them into holes on the sides, then insert the device's power cord and snap the clip over the cord.

NOTE:
1. MGE UPS SYSTEMS recommends even distribution of attached devices across the all available outlets to avoid exceeding the outlet, quad or octet ratings limitations.  See *Power Ratings* in Technical Specifications for more information.
2. The outlet retention clips provided with 230V units are designed for use with MGE UPS SYSTEMS's IEC 60320/C13 to IEC 60320/C14 cable and may not properly fit 3rd party cables.

Always disconnect the power supply cord before opening to avoid electrical shock.
Afin d'éviter les chocs électriques, débranchez le cable électrique avant d'ouvrir.
Immer Netzleitung auskuppeln vor den Aufmachen um elektrischen Schlag zu vermeiden.

## Connecting the Sensors

The AmpMeter PDU may be equipped with two mini RJ11 T/H ports for attachment of the included Temperature/Humidity sensor.  Attach the mini RJ11 plug of the sensor(s) to the appropriate T/H port if applicable.

## Connecting to the Unit (Remote Monitoring Units Only)

### Serial (RS232) port

AmpMeter PDU models may be equipped with an RJ45 Serial RS-232 port for attachment to a PC or networked terminal server using the supplied RJ45 to RJ45 crossover cable and RJ45 to DB9F serial port adapter as required.  See *Data Connections* in Technical Specifications for more information on the Serial RS-232 port.

### Ethernet port

AmpMeter PDU models may be equipped with an RJ45 10/100Base-T Ethernet port for attachment to an existing network.  This connection allows access via Telnet, Secure Shell (SSH) or a common web browser.

The unit configured with the following network defaults to allow unit configuration out-of-the-box through either Telnet/SSH or via a web browser:

- IP address:          192.168.1.254
- Subnet Mask:      255.255.255.0
- Gateway:            192.168.1.1

The local PC network connection must be configured as noted below:

NOTE: Contact your system administrator for instructions in reconfiguring the network connection. Reconfiguration of your network connection may require a restart to take effect.

- IP address:          192.168.1.x (where x is 2-253)
- Subnet Mask:      255.255.255.0

# 3. Operations

# 3. Operations

This chapter contains information on commands and abilities available only in models equipped for remote monitoring.

## Interfaces

The AmpMeter PDU has two interfaces: the HTML interface accessed via the HTTP enabled Ethernet connections and the command line for serial and Telnet connections.

### Usernames and Passwords

The AmpMeter PDU has one predefined administrative user account (username/password: MGEUPS/MGEUPS) and supports a maximum of 128 defined user accounts

NOTE: For security, MGE UPS SYSTEMS recommends removal of the predefined administrative user account after a new account with administrative rights has been created.

Only an administrative-level user may perform operations such as creating/removing user accounts and command privileges, changing passwords and displaying outlet and user information. An administrator may also view the status of and control power to all outlets.

The administrator may create additional user accounts and then grant these users the right to view the status of and control power to specific outlets, groups and ports.

Usernames may contain from 1 to 16 characters and are not case sensitive; spaces are not allowed. Passwords may contain up to 16 characters, and are case sensitive.

# 3. Operations

## HTML Interface

The HTML interface is constructed of three major components: the System Location bar, the User/Navigation bar and the Control Screen. The System Location bar displays the AmpMeter PDU's location and IP address as well as the current Control Screen title. The User/Navigation bar displays the current user and privilege level and provides access to all HTML pages. And the Control Screen is used to display current data and allow changes to outlet states or system configuration.

The following sections describe each interface section/page and their use.
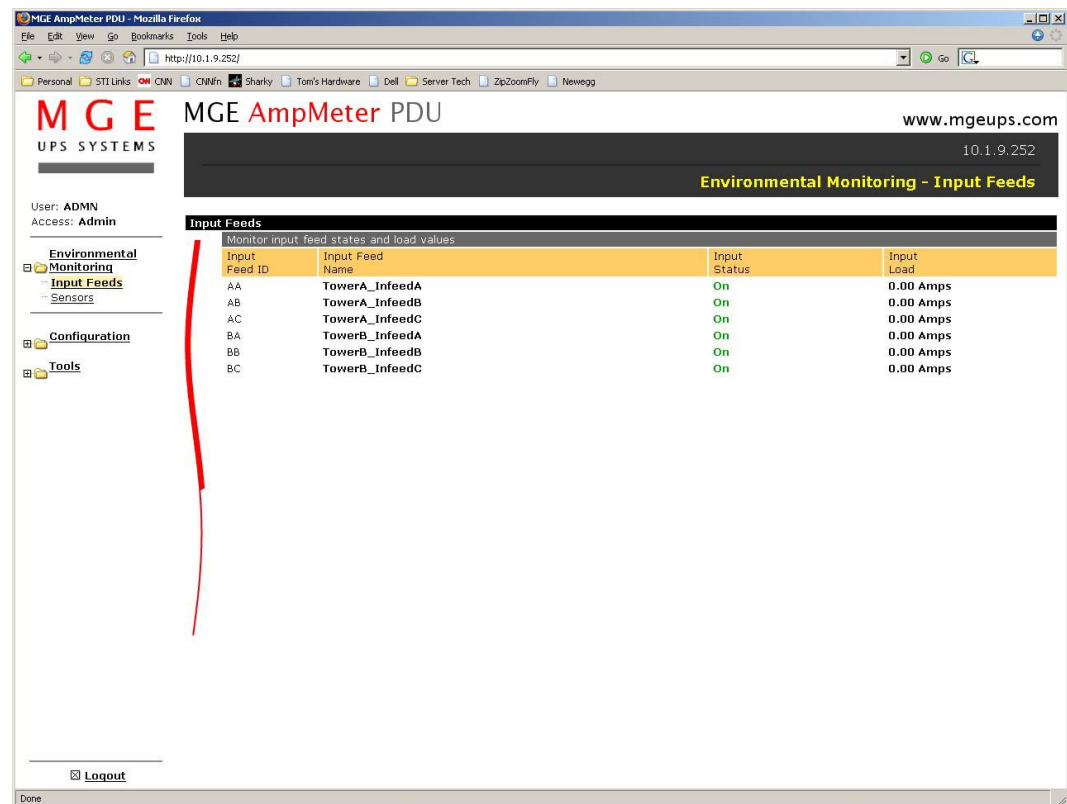


**Figure 4.  Example HTML page**

### Logging In

Logging in through HTML via a web browser requires directing a web client to the configured IP address of the unit.

**To log in by HTML:**

1.  In the login window, enter a valid username and password and press **OK**.

    If you enter an invalid username or password, you will be prompted again.

    You are given three attempts to enter a valid username and password combination. If all three fail, the session ends and a protected page will be displayed.

# 3. Operations

## Environmental Monitoring

The Environmental Monitoring section offers access to the Input Load page. This section is available to administrative level users and users with Environmental Monitoring view rights.

## Input Load

The Input Load page displays the AmpMeter PDU (s) absolute and descriptive name and the cumulative input load in amperes of all devices attached to the AmpMeter PDU at the time the page was loaded. This page will refresh automatically every 10 seconds.

## Sensors

The Sensors page displays:

- Temperature/humidity sensor's absolute and descriptive names
- Temperature/humidity sensor readings in degrees Celsius and percent relative humidity

## Configuration

The Configuration section offers access to all unit configuration options including Network, Telnet/HTTP, Serial Ports, Outlets, Groups, Users, FTP, Proxy/SNTP and SNMP. This section is available to administrative level users only.

## System

The System configuration page is used for reference of system information such as Ethernet NIC Serial Number, Ethernet MAC address and system firmware and hardware revisions as well as assignment and maintenance of the system location and tower descriptive names.

For description names, up to 24 alphanumeric and other typeable characters (ASCII 33 to 126 decimal – spaces and colon characters are not allowed) are allowed.

NOTE: Spaces may be used for the location description only.

**Creating a descriptive system location name:**

Enter a descriptive name and press **Apply**.

**Creating a descriptive unit name:**

Click on the **Tower Names** link.

On the subsequent Tower Names page, enter a descriptive name and press **Apply**.

**Creating descriptive input feed names:**

Click on the **Input Feed Names** link.

On the subsequent Input Feed Names page, enter a descriptive name and press **Apply**.

**Creating a descriptive Pass through port name:**

Click on the **Serial Port Names** link which will open the Serial Ports configuration page. See Creating a descriptive serial port name: on page 14 for additional information on creating descriptive Serial port names.

**Creating a descriptive Environmental Monitor name:**

Click on the **Environmental Monitor Names** link.

On the subsequent Environmental Monitor Names page, enter a descriptive name and press **Apply**.

**Creating descriptive sensor names:**

Click on the **Sensor Names** link.

On the subsequent Sensor Names page, enter a descriptive name and press **Apply**.

# 3. Operations

## Network

The Network configuration page is used for maintenance of the network interface.  From this page an administrator may configure the IP address, subnet mask and gateway address as well as view the link status, speed and duplex value.

The AmpMeter PDU is configured with the following network defaults to allow unit configuration out-of-the-box through either Telnet or HTML:

- IP address:            192.168.1.254
- Subnet Mask:        255.255.255.0
- Gateway:              192.168.1.1

The initial local PC network connection must be configured as noted below:

NOTE: Contact your system administrator for instructions in reconfiguring the network connection. Reconfiguration of your network connection may require a restart to take effect.

- IP address:            192.168.1.x (where x is 2-253)
- Subnet Mask:        255.255.255.0

NOTE:  The unit must be restarted after network configuration changes. See *Performing a warm boot:* on page 17.

### Setting the IP address, subnet mask or gateway:

In the appropriate field, enter the IP address, subnet mask or gateway address and press **Apply**.

## Telnet/SSH

The Telnet/SSH configuration page used to enable or disable Telnet and SSH support and configure the port number that the Telnet or SSH server watches.  For more information on SSH see page 35.

### Enabling or disabling Telnet or SSH support:

Select **Enabled** or **Disabled** from the appropriate Server drop-down menu and press **Apply**.

### Changing the Telnet or SSH server port number:

In the appropriate Port field, enter the port number and press **Apply**.

## HTTP/SSL

The HTTP/SSL configuration page used to enable or disable HTTP and SSL support, configure the port number that the HTTP server watches and responds to, selection of the method of authentication used and SSL access level.  For more information on SSL see page 34 in.

### Enabling or disabling HTTP or SSL support:

Select **Enabled** or **Disabled** from the appropriate Server drop-down menu and press **Apply**.

### Changing the HTTP server port number:

In the HTTP Port field, enter the port number and press **Apply**.

# 3. Operations

**Setting the HTTP authentication method:**

The AmpMeter PDU HTTP server supports two authentication methods for security and validation of the username-password – Basic and MD5 digest.

The Basic method utilizes Base64 encoding to encode and deliver the username-password over the network to the HTTP server for decoding and authentication.  This basic method is supported by all web browsers and offers a minimum level of security.

NOTE:  The Base64 algorithm is widely-known and susceptible to packet-sniffer attack for acquisition of the encoded username-password string.

The MD5 digest method provides stronger protection utilizing one-way encoded hash numbers, never placing the username-password on the network.  Instead, the sending browser creates a challenge code based on the hash algorithm, provided username-password and unique items such as the device IP address and timestamp, which is compared against the HTTP server internal user database of valid challenge codes.  The MD5 digest method offers a higher level of security than the Basic method but at present is not supported by all browsers.

NOTE: MD5 is known to be fully supported by Internet Explorer 5.0+, Navigator 7.0+ and Firefox 1.0+.

Select **Basic** or **MD5** from the Authentication drop-down menu and press **Apply**.

**Setting SSL access level**

AmpMeter PDU SSL supports configuration of SSL connections as being either optional or required.  The default access level is set to optional.

- Optional –Both non-secure (HTTP) and SSL encrypted connections (HTTPS) are allowed access.
- Required – ONLY SSL encrypted connections (HTTPS) are allowed access.

Select **Optional** or **Required** from the Secure Access drop-down menu and press **Apply**.

## Serial Ports

The Serial Ports configuration page is used for maintenance of the serial ports.

NOTE:  Pass through connections may only be initiated from the command line interface via a Telnet/SSH session.

**Setting the data-rate for the serial ports:**

Select the serial port data-rate from the drop-down menu and press **Apply**.

**Creating a descriptive serial port name:**

Click on the **Edit** link in the Action column next to the port to be configured.

On the subsequent Serial Port Edit page, enter the descriptive name.  Up to 24 alphanumeric and other typeable characters (ASCII 33 to 126 decimal, spaces and colon characters are not allowed) are allowed.  Press **Apply**.

**Enabling or disabling serial port active signal checking:**

Click on the **Edit** link in the Action column next to the port to be configured.

On the subsequent Serial Port Edit page, select **On** or **Off** from the DSR Check drop-down menu and press **Apply**.

## Users

The Users configuration page is used for creation and removal of usernames, assignment of accessible outlets and group, assignment of privilege levels and the changing of user passwords.

**Creating a new user:**

Enter a user name in the Username field.  Up to 24 alphanumeric and other typeable characters (ASCII 33 to 126 decimal, spaces and colon characters are not allowed) are allowed.

Enter a password for the new user and verify in the Password and Verify Password fields.  For security, password characters are not displayed.  Press **Apply**.

# 3. Operations

**Removing a user:**

Click on the **Remove** link in the Action column for the user to be removed and press **Yes** on the subsequent confirmation window.

**Changing a user password:**

Click on the **Edit** link in the Action column for the associated user.

On the subsequent User Edit page, enter a password and verify the new password for the new user in the Password and Verify Password fields.  For security, password characters are not displayed.  Press **Apply**.

**Changing a user's access privilege level:**

The AmpMeter PDU has four defined access privilege levels; Admin, User, On-Only and View-Only:

- Admin:        Full-access for all configuration, control (On, Off, Reboot), status and Pass through.
- User:         Partial-access for status and Pass through of assigned outlets, groups and serial ports.

The administrator may also grant administrative privileges to other user accounts allowing the AmpMeter PDU to have more than one administrative-level user.

NOTE: You cannot remove administrative privileges from the MGEUPS user unless another user has already been given administrative access level privileges created.

Click on the **Edit** link in the Action column for the associated user.

On the subsequent User Edit page, select **Admin**, **User, On-only** or **View-only** from the Access Level drop-down menu and press **Apply**.

**Granting or removing Environmental Monitoring viewing privileges:**

Click on the **Edit** link in the Action column for the associated user.

On the subsequent User Edit page, select **Yes** or **No** from the Environmental Monitoring drop-down menu and press **Apply**.

**Adding and Deleting serial port access:**

Click on the **Ports** link in the Access column for the associated user.

On the subsequent User Ports page, select or deselect ports to be accessed by the user and press **Apply**.

## FTP

The FTP configuration page is used for setup and maintenance of all settings required to perform an FTP firmware upload.  See page  46, Uploading Firmware for more information on uploading firmware.

**Setting the FTP Host IP Address:**

Enter the IP address in the Host IP Address field and press **Apply**.

**Setting the FTP username:**

Enter the FTP server username in the Username field, and press **Apply**.

**Setting the FTP password:**

Enter the FTP server password in the Password field, and press **Apply**.

**Setting the filepath:**

Enter the path of the file to be uploaded in the Directory field, and press **Apply**.

**Setting the filename for upload:**

Enter the filename of the file to be uploaded in the Filename field, and press **Apply**.

# 3. Operations

**Testing the FTP upload configuration:**

This test validates that the unit is able to contact and log onto the specified FTP server, download the firmware file and verify that the firmware file is valid for this unit.

Press **Test**.

## SNTP

The SNTP configuration page is used for setup and maintenance of SNTP support.

**Setting the SNTP Server Address:**

Enter the IP address in the primary and/or secondary address field and press **Apply**.

## SNMP

The SNMP configuration page is used for setup and maintenance of all settings required to enable SNMP support as well as access to the trap configuration pages. For additional information on SNMP support and detailed descriptions of available traps, see on page 34.

NOTE: Traps are generated according to a hierarchical architecture; i.e. if a Tower Status enters a trap condition, only the Tower Status trap is generated. Infeed and Outlet Status traps are suppressed until the Tower Status returns to Normal.

**Enabling or disabling SNMP support:**

Select **Enabled** or **Disabled** from the drop-down menu and press **Apply**.

**Setting the community strings:**

Enter the community string in the appropriate field and press **Apply**.
Community strings may be 1 to 24 characters

**Setting the trap timer:**

Enter a trap timer value in the Error Trap Repeat Time field and press **Apply**.
The Error Trap Repeat Time value may be 1 to 65535 (in seconds).

**Setting trap destinations:**

Enter an IP address in the appropriate Trap Destination field and press **Apply**.

**Enabling or disabling tower traps:**

Click on the **Tower Traps** link.

On the subsequent Tower Traps page, select or deselect the desired traps and press **Apply**.

**Configuring input feed traps:**

Click on the **Input Feed Traps** link.

On the subsequent Input Feed Traps page, select or deselect the desired traps and press **Apply**.

For Load traps, enter a maximum load value for the infeed in the High Load Threshold field and press **Apply**.
The High Load Threshold value may be 0 to 255 (in amperes).

# 3. Operations

## Tools

The Tools section contains access to rebooting the unit, uploading new firmware as well as resetting the unit to factory defaults.  This section is available to administrative level users only.

## Restart

### Performing a warm boot:

Select the **Restart** from the Action drop-down menu and press **Apply**.

Note:  System user/outlet/group configuration or outlet states are NOT changed or reset with this command.

### Resetting to factory defaults:

See To reset to factory defaults from the HTML interface on page 46 for more information on resetting a AmpMeter PDU to factory defaults from the HTML interface.

### Uploading new firmware:

See Uploading Firmware on page 46 for more information on uploading new firmware from the HTML interface.

# 3. Operations

## Command Line Interface

### Logging In

Logging in through Telnet requires directing the Telnet client to the configured IP address of the unit.

Logging in through the Console (RS232) port requires the use of a terminal or terminal emulation software configured to support ANSI or VT100 and a supported data rate (300, 1200, 2400, 4800, 9600, 19200, 38400, 57600, or 115200 BPS) - 8 data bits-no parity-one stop bit and Device Ready output signal (DTR or DSR).

**To log in by RS-232 or Telnet:**

1. Press **Enter**. The following appears, where **x.xx** is the firmware version:
   ```
   AmpMeter PDU Version x.xx
   Username:
   ```
   NOTE: Logging in by Telnet will automatically open a session.  It is not necessary to press Enter.

2. At the Username: and Password: prompts, enter a valid username and password. And press **Enter**.

   You are given three attempts to enter a valid username and password combination. If all three fail, the session ends.

When you enter a valid username and password, the command prompt (AmpMeter PDU:) appears. If a location identifier was defined, it will be displayed before the AmpMeter PDU: prompt.  See *Creating a location description* on page 26 for more information.

You may enter commands in any combination of uppercase and lowercase. You must enter all command characters correctly; there are no command abbreviations. There are two types of commands: operations and administration. A user must have administrative privileges to use the administration commands. The following tables list and briefly describe each command.

### Operations Command Summary

| Command | Description |
|---|---|
| ILoad | Displays the cumulative input load per branch or phase |
| Istat | Displays the status of the infeeds |
| Connect | Connects to a serial port |
| Login | Ends the current session and brings up the Username: prompt |
| Logout | Ends a session |
| Quit | Ends a session |
| List Ports | Lists all accessible serial ports for the current user |

### Administrative Command Summary

| | |
|---|---|
| Add Porttouser | Grants a user access to one or all serial ports |
| Create User | Adds a user account |
| Delete Portfromuser | Removes access to one or all serial ports |
| List User | Displays all accessible outlets/groups/ports for a user |
| List Users | Displays privilege levels for all users |
| Remove User | Deletes a user account |
| Restart | Performs a warm boot |
| Set Envmon Name | Specifies a descriptive field for the integrated Environmental Monitor |
| Set Envmon THS Name | Specifies a descriptive field for a temperature-humidity sensor |

**Administrative Command Summary (continued)**

| | |
|---|---|
| Set FTP Filename | Specifies the file to be uploaded via FTP |
| Set FTP Filepath | Specifies the filepath for the file to be uploaded |
| Set FTP Host | Sets the FTP Host IP address |
| Set FTP Password | Sets the password for the FTP Host |
| Set FTP Username | Sets the username for the FTP Host |
| Set Gateway | Sets the Gateway |
| Set Infeed Name | Specifies a descriptive field for the infeed |
| Set Ipaddress | Sets the IP address |
| Set Location | Specifies a descriptive field for the HTML control screen and login banner |
| Set Subnet Mask | Sets the Subnet Mask |
| Set Telnet Port | Sets the Telnet server port number |
| Set Telnet | Enables or disables Telnet access |
| Set Tower Name | Specifies a descriptive field for the AmpMeter PDU |
| Set User Access | Sets the access level for a user |
| Set User Envmon | Grants or removes privileges to view input and environmental monitoring status |
| Set User Password | Changes the password for a user |
| Set Port Name | Specifies a descriptive field for a serial port |
| Set Port Dsrchk | Sets the DSR active signal checking for a serial port |
| Set Port Speed | Set the connection speed for all serial ports |
| Show FTP | Displays FTP configuration information |
| Show Infeeds | Displays infeed configuration information |
| Show Network | Display network configuration information |
| Show Ports | Displays serial port configuration information |
| Show System | Displays system configuration information |
| Show Towers | Displays tower configuration information |
| Version | Displays the AmpMeter PDU firmware version |

## To display the names of commands that you may execute:

At the command prompt, press **Enter**. A list of valid commands for the current user appears.

# 3. Operations

## Operations Commands

Operations commands provide information about the AmpMeter PDU environment and control session operations.

### Displaying accessible serial ports

The List Ports command displays accessible serial ports for the current user.

#### *To display accessible serial ports:*

At the AmpMeter PDU: prompt, type **list ports** and press **Enter**.

#### *Example*

The follow command displays all accessible serial ports for the current user:

```
AmpMeter PDU: list ports<Enter>

   Port      Port
   ID        Name
   Console   Console
```

### Displaying infeed status

The Istat or Iload command displays the status of one or more infeed.

This display includes the infeed absolute and descriptive names and the Input Status and current Load reported to the AmpMeter PDU by the infeed.

#### *To display status of one or more infeeds:*

Type **istat** and press **Enter**, or

Type **iload** and press **Enter**.

#### *Examples*

The following command displays the infeed status:

```
AmpMeter PDU: istat

   Input     Input                      Input       Input
   Feed ID   Feed Name                  Status      Load

   .AA       HQ_1_Infeed_A              On          10.5 Amps
```

### Connecting to a serial device

The Connect command allows Pass through serial connection to devices attached to the standard serial port (Console).

#### *To connect to a serial device:*

At the AmpMeter PDU: prompt, type **connect console** and press **Enter**.

#### *To disconnect from a serial device:*

Type:  **!*break** and press **Enter**.

# 3. Operations

**Displaying the status of the Environmental Monitor**

The Envmon command displays the status of the integrated Environmental Monitor.

By default, only administrative user accounts are allowed access to the Envmon command.  An administrator may user the Set User Envmon command to enable and disable access for other user accounts.

*To display the status of the Environmental Monitor:*

At the AmpMeter PDU: prompt, type **envmon** and press **Enter**.

*Example*

The following command displays the status of the Environmental Monitor.

```
AmpMeter PDU: envmon<Enter>
Environmental Monitor .A
   Name: Florida_HQ_1                  Status: Normal

   Temperature/Humidity Sensors

     ID    Name                        Temperature    Humidity
     .A1   Temp_Humid_Sensor_A1        Not Found      Not Found
     .A2   T/H2_Florida_HQ_1           23.5 Deg. C    22 % RH
```

**Starting a new session**

The Login command activates the Username: prompt. The current session ends, allowing a user to log in and start a new session under a different username.

*To start a new session:*

At the AmpMeter PDU: prompt, type **login** and press **Enter**.  The Username: prompt appears.

**Ending a session**

The Quit or Logout commands ends a session. A session ends automatically when no activity is detected for five minutes, or upon loss of connection.

*To end a session:*

At the AmpMeter PDU: prompt, type **quit** and press **Enter**, or

Type **logout** and press **Enter**.

# 3. Operations

## Administration Commands

Administration commands may only be issued by a user with administrative privileges, such as the predefined MGEUPS user or another user who has been granted administrative privileges with the Set User MGEUPSpriv command.

## User Administration

### Creating a user account

The Create User command creates a user account with the specified username and password. See *Usernames and Passwords* in this chapter for more information.

***To create a user account:***

At the AmpMeter PDU: prompt, type **create user**, optionally followed by a 1-16 character username (Spaces are not allowed, and usernames are not case sensitive). Press **Enter**.

At the Password: prompt, type a password of up to 16 alphanumeric and other typeable characters (ASCII 32 to 126 decimal). Passwords are case sensitive. Press **Enter**.  To specify no password, press **Enter** at the prompt.

At the Verify Password: prompt, retype the password.  Press **Enter**. To verify no password, press **Enter** at the prompt.

***Example***

The following command creates the user account JaneDoe:

```
AmpMeter PDU: create user JaneDoe<Enter>
Password: <Enter>
Verify New Password: <Enter>
```

For security, password characters are not displayed.

### Removing a user account

The Remove User command removes a user account.

NOTE: You may remove the predefined user account MGEUPS only if another user account has been granted administrative privileges using the Set User MGEUPSpriv command.

***To remove a user account:***

At the AmpMeter PDU: prompt, type **remove user**, optionally followed by a username. Press **Enter**.

**Changing a password**

The Set User Password command changes a user's password.   For security, when you type a password, the characters are not displayed on the screen.  See *Usernames and Passwords* for more information.

*To change a password:*

At the AmpMeter PDU: prompt, type **set user password**, followed by a username and press **Enter**.

At the Password: prompt, type the new password and press **Enter**. Passwords may contain up to 16 characters, and spaces are not allowed. To specify no password, press **Enter** at the prompt.

At the Verify Password: prompt, retype the new password and press Enter.  To verify no password, press **Enter** at the prompt.

*Examples*

The following command changes the password for the user JohnDoe:

```
AmpMeter PDU: set user password johndoe<Enter>
   Password: <Enter>
   Verify Password: <Enter>
```

The following command blanks the password for the user JaneDoe:

```
AmpMeter PDU: set user password<Enter>
   Username: janedoe<Enter>
   Password: <Enter>
   Verify Password: <Enter>
```

**Setting user access level privileges**

The Set User Access command sets the access level privileges for a user.   The AmpMeter PDU has two defined access privilege levels; Admin, User.  For more information on user access levels, see *Changing a user's access privilege level:* on page 15.

The administrator may also grant administrative privileges to other user accounts allowing the AmpMeter PDU to have more than one administrative-level user.

NOTE: You cannot remove administrative privileges from the MGEUPS user unless another user has already been given administrative access level privileges created.

*To set the access level privilege for a user:*

At the AmpMeter PDU: prompt, type **set user access**, followed by **admin**, or **user,** optionally followed by a username and press **Enter**.

*Examples*

The following command sets the user access level for JohnDoe to Admin:

```
AmpMeter PDU: set user access admin johndoe<Enter>
```

The following command sets the user access level for JaneDoe to User:

```
AmpMeter PDU: set user access user janedoe<Enter>
```

# 3. Operations

### Granting and removing input status viewing privileges

The Set User Envmon command grants or removes input status viewing privileges to/from a user.

NOTE: This command also grants or removes viewing privileges for the status of the optional Equipment Cabinet Environmental Manager and attached sensors. See the Equipment Cabinet Environmental Manager Installation and Operations manual for more information.

#### *To grant or remove input status viewing privileges for a user:*

At the AmpMeter PDU: prompt, type **set user envmon** followed by **on** or **off**, optionally followed by a username and press **Enter**.

#### *Example*

The following command grants intput status viewing privileges to the user JohnDoe:

```
AmpMeter PDU: set user envmon on johndoe<Enter>
```

## Displaying the access privilege levels

The List Users command displays all defined users with their access privilege level.

#### *To display user access privilege levels:*

At the AmpMeter PDU: prompt, type **list users** and press **Enter**.

#### *Example*

The following command displays all users with their access privilege level:

```
AmpMeter PDU: list users<Enter>
    User            Privilege    Environmental
    Name            Level        Monitoring

    JOHNDOE         Admin        Allowed
    JANEDOE         User         Not Allowed
```

## Adding serial port access to a user

The Add PortToUser command grants a user access to the serial port.

#### *To grant serial port access to a user:*

At the AmpMeter PDU: prompt, type **add porttouser console** and a username. Press **Enter**.

## Deleting serial port access for a user

The Delete PortFromUser command removes a user's access to the serial port. You cannot remove access to the serial port for an administrative level user.

#### *To delete serial port access for a user:*

At the AmpMeter PDU: prompt, type **delete portfromuser console** and a username. Press **Enter**.

**Displaying user serial port access**

The List User command displays all ports for a user.

***To display user serial port access:***

At the AmpMeter PDU: prompt, type **list user**, optionally followed by a username.  Press **Enter**.

***Example***

The following command displays information about the user JaneDoe:

```
AmpMeter PDU: list user janedoe<Enter>
   Username: JANEDOE
      Ports:
            Port      Port
            ID        Name
            Console   Console
```

JaneDoe may access the Console serial port.

## Serial Port Administration

**Creating a descriptive serial port name**

The Set Port Name command assigns a descriptive name to a serial port.  You may use this name in commands that require a port name as an alternative to using the port's absolute name.

***To create a port name:***

At the AmpMeter PDU: prompt, type **set port name**, followed by the absolute outlet name and a descriptive name of up to 24 alphanumeric and other typeable characters (ASCII 33 to 126 decimal - spaces are not allowed).  Port names are not case sensitive.  Press **Enter**.

***Example***

The following command adds the descriptive name Rack1 to Console port:

```
AmpMeter PDU: set port name console Rack1<Enter>
```

**Setting the serial ports data-rate**

The Set Port Speed command sets the default data-rate for the serial port.
Valid data-rates are 1200, 2400, 4800, 9600, 19200, 38400, 57600 and 115200.

***To set the serial port data-rate:***

At the AmpMeter PDU: prompt, type **set port speed**, follow by the data-rate and press **Enter**.

***Example***

The following command sets the serial ports data-rate to 38400 BPS:

```
AmpMeter PDU: set port speed 38400<Enter>
```

**Enabling or disabling active signal checking for serial connections**

The Set Port Dsrchk command enables or disables active signal checking for serial connections to devices attached to any of the available serial ports.

***To enable or disable active signal checking for serial connections:***

At the AmpMeter PDU: prompt, type **set port dsrchk console**, **on** or **off,** and press **Enter**.

# 3. Operations

### Displaying serial port information

The Show Ports command displays information about all serial ports.  This information includes:

- Serial port data rate
- Descriptive port name, if applicable
- DSR signal checking settings

### *To display serial port information:*

At the AmpMeter PDU: prompt, type **show ports** and press **Enter**.

### *Example*

The following command displays all serial port information:

```
AmpMeter PDU: show ports<Enter>
    Serial Port Configuration
       ALL Ports:
           Baud Rate: 38400
       Console Port:
           DSR Check: ON
```

## System Administration

### Creating a location description

The Set Location command specifies text that appears in the HTML control screen's Location field. The text is also appended to a Welcome to banner that appears when a user successfully logs in serially or through a Telnet session.

If you do not issue this command, or if you issue this command without specifying any text, the control screen 's Location field will be blank and no Welcome to banner will be displayed.

### *To create a location description:*

At the AmpMeter PDU: prompt, type **set location**, followed by a descriptive name of up to 24 alphanumeric and other typeable characters (ASCII 32 to 126 decimal - spaces are allowed). Press **Enter**.

Omitting any characters after typing 'set location' deletes any previously specified text.

### *Examples*

The following command specifies Florida HQ as the descriptive location for the control screen and the login banner:

```
AmpMeter PDU: set location Florida HQ<Enter>
```

The following command deletes any previously specified location description:

```
AmpMeter PDU: set location<Enter>
```

In this case, the control screen's Location field will be blank, and no welcome banner will be displayed after a successful login.

**Displaying system configuration information**

The Show System command displays all system configuration information.

- Firmware version
- NIC module serial number and MAC address
- Hardware revision code and Flash size
- Uptime since last system restart
- System location description

See 0on page 32 for more information on SNMP.

*To display system configuration information:*

At the AmpMeter PDU: prompt, type **show system** and press **Enter**.

*Example*

```
System Information

   F/W Version:    AmpMeter PDU Version 5.2i
   NIC S/N:        1600001
   MAC Address:    00-0a-9c-10-00-01
   H/W Rev Code:   0
   Flash Size:     1 MB
   Uptime:         0 days 6 hours 14 minutes 1 second

   Location:       Florida HQ
```

**Creating a descriptive tower name**

The Set Tower Name command assigns a descriptive name to a tower.  This descriptive name is displayed when the Show Traps command is issued.  See ??? on page 28 for more information on the Show Traps command.

*To create a tower name:*

At the AmpMeter PDU: prompt, type **set tower name**, followed by the absolute tower name, then the descriptive name of up to 24 alphanumeric and other typeable characters (ASCII 33 to 126 decimal - spaces are not allowed).  Press **Enter**.

*Examples*

The following command adds the descriptive name Florida_HQ_1 to tower .a:

```
AmpMeter PDU: set tower name .a Florida_HQ_1<Enter>
```

**Displaying tower information**

The Show Towers command displays information about the AmpMeter PDU.  This information includes the absolute and descriptive AmpMeter PDU names.

*To display tower information:*

At the AmpMeter PDU: prompt, type **show towers** and press **Enter**.

*Example*

```
AmpMeter PDU: show towers<Enter>
   Tower    Tower
   ID       Name
   .A       Florida_HQ_1
```

# 3. Operations

**Creating a descriptive infeed name**

The Set Infeed Name command assigns a descriptive name to an infeed. This descriptive name is displayed when the Show Traps command is issued.

*To create a infeed name:*

At the AmpMeter PDU: prompt, type **set infeed name**, followed by the absolute infeed name, then the descriptive name of up to 24 alphanumeric and other typeable characters (ASCII 33 to 126 decimal - spaces are not allowed). Press **Enter**.

*Example*

The following command adds the descriptive name HQ_1_Infeed_A to the infeed on the AmpMeter PDU:

```
AmpMeter PDU: set infeed name .aa HQ_1_Infeed_A<Enter>
```

**Displaying Infeed information**

The Show Infeeds command displays information about all infeeds. This information includes the absolute and descriptive infeed names.

*To display tower information:*

At the AmpMeter PDU: prompt, type **show infeeds** and press **Enter**.

*Example*

```
AmpMeter PDU: show infeeds<Enter>
    Input    Input
    Feed ID  Feed Name
    .AA      HQ_1_Infeed_A
    .AB      HQ_1_Infeed_B
    .BA      HQ_2_Infeed_A
    .BB      HQ_2_Infeed_B
```

**Displaying the firmware version**

The Version command displays the firmware version.

*To display the firmware version:*

At the AmpMeter PDU: prompt, type **version** and press **Enter**.

**Performing a warm boot**

The Restart command performs a warm boot of the AmpMeter PDU.

NOTE: System user/outlet/group/port configuration or outlet states are NOT changed or reset with this command.

*To perform a warm boot:*

At the AmpMeter PDU: prompt, type **restart** and press **Enter**.

## TCP/IP Administration

NOTE: A restart of the AmpMeter PDU is required after setting or changing ANY TCP/IP configurations. See *Performing a warm boot* on page 28 for more information.

**Setting the IP address**

The Set Ipaddress command sets the TCP/IP address of the network interface controller.

*To set the IP address:*

At the AmpMeter PDU: prompt, type **set ipaddress**, followed by the IP address and press **Enter**.

*Example*

The following command sets the IP address to 12.34.56.78:

```
AmpMeter PDU: set ipaddress 12.34.56.78<Enter>
```

**Setting the subnet mask**

The Set Subnet command sets the subnet mask for the network the PT40 will be attached to.

*To set the subnet mask:*

At the AmpMeter PDU: prompt, type **set subnet**, followed by the subnet mask and press **Enter**.

*Example*

The following command sets the subnet mask to 255.0.0.0

```
AmpMeter PDU: set subnet 255.0.0.0<Enter>
```

**Setting the gateway**

The Set Gateway command sets the IP address of the default gateway the AmpMeter PDU uses to access external networks.

*To set the gateway IP address:*

At the AmpMeter PDU: prompt, type **set gateway**, followed by the gateway IP address and press **Enter**.

*Example*

The following command set the gateway IP address to 12.34.56.1:

```
AmpMeter PDU: set gateway 12.34.56.1<Enter>
```

**Displaying network configuration information**

The Show Network command displays TCP/IP, Telnet, SSH, Web, SSL and SNMP configuration information.

- IP address, subnet mask and gateway
- Enabled-disabled status of Telnet, SSH, HTTP,SSL and SNMP support
- Telnet, SSH, and HTTP port numbers
- HTTP authentication method and SSL access setting
- Network status

See page 32 for more information on SNMP and Secure Proxy

*To display network configuration information:*

At the AmpMeter PDU: prompt, type **show network** and press **Enter**.

*Example*

The following command displays the network configuration information:

```
AmpMeter PDU: show network<Enter>
   Network Configuration

      IP Address:    12.34.56.78
      Subnet Mask:   255.0.0.0
      Gateway:       12.34.56.1

      Telnet:        Enabled      Port:    23
      SSH:           Enabled      Port: 65535
      HTTP:          Enabled      Port:    80     Security: BASIC
      SSL:           Enabled                      Access:   Required
      SNMP:          Enabled

   Network Status

      Link:          Up
      Speed:         100 Mbps
      Duplex:        Full
      Negotiation:   Auto
```

# 3. Operations

## HTTP Administration

> NOTE: A restart is required after setting or changing ANY Telnet/Web configurations. See *Performing a warm boot* on page 28 for more information.

### Enabling and disabling HTTP support

The Set HTTP command is used to enable or disable HTTP support.

#### *To enable or disable HTTP support:*

At the AmpMeter PDU: prompt, type **set http**, followed by **enabled** or **disabled** and press **Enter**.

### Changing the HTTP server port

With HTTP support enabled, the HTTP server watches and responds to requests on the default HTTP port number 80. This port number may be changed using the Set HTTP Port command.

#### *To change the HTTP port:*

At the AmpMeter PDU: prompt, type **set http port**, followed by the port number and press **Enter***.*

#### *Example*

The following changes the HTTP port number to 2048:

```
AmpMeter PDU: set HTTP port 2048<Enter>
```

### Setting the HTTP authentication method

The Set HTTP Security command is used to set the method of authentication. The AmpMeter PDU HTTP server supports two authentication methods for security and validation of the username-password – Basic and MD5 digest.

For more information on authentication methods, see *Setting the HTTP authentication method:* on page 14.

#### *To set the HTTP authentication method:*

At the AmpMeter PDU: prompt, type **set http security**, followed by **basic** or **md5** and press **Enter**.

## Telnet Administration

> NOTE: A restart of the AmpMeter PDU is required after setting or changing ANY Telnet/Web configurations. See *Performing a warm boot* on page 28 for more information.

### Enabling and disabling Telnet support

The Set Telnet command is used to enable or disable Telnet support.

#### *To enable or disable Telnet support:*

At the AmpMeter PDU: prompt, type **set telnet**, followed by **enabled** or **disabled** and press **Enter**.

### Changing the Telnet port

With Telnet support enabled, the Telnet server watches and responds to requests on the default Telnet port number 23. This port number may be changed using the Set Telnet Port command.

#### *To change the Telnet socket:*

At the AmpMeter PDU: prompt, type **set telnet port**, followed by the port number and press **Enter**.

#### *Example*

The following changes the Telnet port number to 7001:

```
AmpMeter PDU: set telnet port 7001<Enter>
```

# 3. Operations

## FTP Administration

You may upload new versions of firmware into the AmpMeter PDU using File Transfer Protocol (FTP).  This allows access to new firmware releases for firmware improvements and new features additions.  The following commands are used to configure the AmpMeter PDU for an FTP firmware upload.  See 0Uploading Firmware for more information on initiating a FTP firmware upload.

### Setting the FTP Host IP address

The Set FTP Host command sets the FTP host IP address allowing for firmware file uploads.

***To set the FTP Host IP address:***

At the AmpMeter PDU: prompt, type **set ftp host**, followed by the Host IP address and press **Enter**.

***Example***

The following command sets the FTP Host IP address to 12.34.56.99:

```
AmpMeter PDU: set ftp host 12.34.56.99<Enter>
```

### Setting the FTP username

The FTP Username command sets the username as required by the FTP Host.

***To set the FTP username:***

At the AmpMeter PDU: prompt, type **set ftp username**, followed by the FTP username and press **Enter**.

***Example***

The following command sets the FTP username to Guest:

```
AmpMeter PDU: set ftp username guest<Enter>
```

### Setting the FTP Password

The FTP Password command sets the password as required by the FTP Host.

***To set the FTP password:***

At the AmpMeter PDU: prompt, type **set ftp password**, followed by the FTP password and press **Enter**.

***Example***

The following command sets the FTP password to OpenSesame:

```
AmpMeter PDU: set ftp password OpenSesame<Enter>
```

### Setting the filename to be uploaded

The FTP Filename command sets the filename of the firmware file to be uploaded.

***To set the FTP filename:***

At the AmpMeter PDU: prompt, type **set ftp filename**, followed by the firmware filename and press **Enter**.

***Example***

The following command sets the FTP filename to snb_s53a.bin:

```
AmpMeter PDU: set ftp filename snb_s53a.bin<Enter>
```

### Setting the filepath for the file to be uploaded

The FTP Filepath command sets the filepath for the firmware file to be uploaded.

***To set the FTP filepath:***

At the AmpMeter PDU: prompt, type **set ftp filepath**, followed by the filepath and press **Enter**.

***Example***

The following command sets the FTP filepath to ftp://AmpMeter PDU:

```
AmpMeter PDU: set ftp filepath ftp://AmpMeter PDU<Enter>
```

# 3. Operations

### Displaying FTP configuration information

The Show FTP command displays all FTP configuration information.

- FTP Host IP address
- FTP Host username and password
- Firmware filepath and filename

### *To display FTP configuration information:*

At the AmpMeter PDU: prompt, type **show ftp** and press **Enter**.

### *Example*

The following command displays the FTP configuration information:

```
AmpMeter PDU: show ftp<Enter>

    FTP Configuration

        Host IP Address: 12.34.56.99
        Username:        guest
        Password:        OpenSesame
        Directory:       ftp://AmpMeter PDU
        Filename:        snb_s53a.bin
```

## SNTP Administration

AmpMeter PDU supports the use of a network time service to provide a synchronized time reference.

### Setting the SNTP server address

The Set SNTP command is used to set the primary and secondary SNTP server addresses.

### *To set the SNTP server address:*

At the AmpMeter PDU: prompt, type **set sntp**, followed by **primary** or **secondary**, and the SNTP server IP address.  Press **Enter**.

### *Example*

The following command set the primary SNTP server address to 204.152.184.72:

```
AmpMeter PDU: set sntp primary 204.152.184.72<Enter>
```

### Displaying SNTP configuration information

The Show SNTP command displays all SNTP configuration information.

### *To display SNTP configuration information*

At the AmpMeter PDU: prompt, type **show sntp** and press **Enter**.

### *Example*

The following command displays the SNTP configuration information:

```
AmpMeter PDU: show sntp <Enter>

    SNTP Date/Time (GMT): 2003-02-21  21:32:48
        SNTP Primary IP Address:    204.152.184.72
        SNTP Secondary IP Address:  0.0.0.0
```

# 4. Advanced Operations

# 4. Advanced Operations

This chapter contains information on commands and abilities available only in models equipped for remote monitoring.

## SSL

Secure Socket Layers (SSL) version 3 enables secure HTML sessions between a AmpMeter PDU Remote Power Manager and a remote user.  SSL provides two chief features designed to make TCP/IP (Internet) transmitted data more secure:

- Authentication – The connecting client is assured of the identity of the server.
- Encryption – All data transmitted between the client and the server is encrypted rendering any intercepted data unintelligible to any third party.

SSL uses the public-and-private key encryption system by RSA, which also requires the use of digital certificates.  An SSL Certificate is an electronic file uniquely identifying individuals or websites and enables encrypted communication; SSL Certificates serve as a kind of digital passport or credential.  The AmpMeter PDU product's SSL Certificate enables the client to verify the AmpMeter PDU's authenticity and to communicate with the AmpMeter PDU securely via an encrypted session, protecting confidential information from interception and hacking.

### SSL Command Summary

| Command | Description |
| --- | --- |
| Set SSL | Enables/disables SSL support |
| Set SSL access | Sets SSL access as optional or required |

### Enabling and Setting up SSL Support

NOTE:  A restart of the AmpMeter PDU is required after setting or changing ANY SSL configurations.  See *Performing a warm boot* on page 28 for more information.

#### Enabling or disabling SSL support

The Set SSL command is used to enable or disable SSL support.

***To enable or disable SSL support:***

At the AmpMeter PDU: prompt, type **set ssl**, followed by **enabled** or **disabled** and press **Enter**.

#### Setting SSL access level

The Set SSL Access command is used to assign use of SSL as optional or required.  The default access level is set to optional.

***To change the access level:***

At the AmpMeter PDU: prompt, type **set ssl access**, followed **optional** or **required**, and press **Enter**.

***Example***

The following changes the access level to required:

```
AmpMeter PDU: set ssl access required<Enter>
```

### SSL Technical Specifications

Secure Socket Layer (SSL) version 3

Transport Layer Security (TLS) version 1 (RFC 2246)

SSL/TLS-enabled HTTPS server (RFC 2818)

Self-Signed X.509 Certificate version 3 (RFC 2459)

Asymmetric Cryptography:
    1024-bit RSA Key Exchange

Symmetric Cryptography Ciphers:

| | |
| --- | --- |
| TLS_RSA_WITH_AES_256_CBC_SHA | TLS_RSA_WITH_3DES_EDE_CBC_SHA |
| TLS_RSA_WITH_AES_128_CBC_SHA | TLS_RSA_WITH_DES_CBC_SHA |

# 4. Advanced Operations

## SSH

Secure Shell (SSH) version 2 enables secure network terminal sessions between a AmpMeter PDU Remote Power Manager and a remote user over insecure network.  SSH provides an encrypted terminal sessions with strong authentication of both the server and client, using public-key cryptography and is typically used as a replacement for unencrypted Telnet. In addition to enabling secure network terminal sessions to the AmpMeter PDU for configuration and power management, the SSH session may be used for secure Pass through connections to attached devices.

SSH requires the configuration and use of a client agent on the client PC.  There are many freeware, shareware or for-purchase SSH clients available.  Two examples are the freeware client PuTTY and the for-purchase client SecureCRT ® by VanDyke® Software.  For configuration and use of these clients, please refer to the applicable software documentation.

### SSH Command Summary

| Command | Description |
| --- | --- |
| Set SSH | Enables/disables SSH support |
| Set SSH port | Sets the SSH server port number |

## Enabling and Setting up SSH Support

NOTE:  A restart of the AmpMeter PDU is required after setting or changing ANY SSH configurations.  See *Performing a warm boot* on page 28 for more information.

### Enabling or disabling SSH support

The Set SSH command is used to enable or disable SSH support.

#### *To enable or disable SSH support:*

At the AmpMeter PDU: prompt, type **set ssh**, followed by **enabled** or **disabled** and press **Enter**.

### Changing the SSH server port

With SSH support enabled, the SSH server watches and responds to requests on the default SSH port number 22.  This port number may be changed using the Set SSH Port command.

#### *To change the SSH port:*

At the AmpMeter PDU: prompt, type **set ssh port**, followed by the port number and press **Enter**.

#### *Example*

The following changes the SSH port number to 65535:

```
AmpMeter PDU: set ssh port 65535<Enter>
```

## SSH Technical Specifications

Secure Shell  (SSH) version 2

Asymmetric Cryptography:
    Diffie-Hellman DSA/DSS 512-1024 (random) bits per NIST specification

Symmetric Cryptography:

| AES256-CBC | RIJNDAEL256-CBC | 3DES-192-CBC |
| AES192-CBC | RIJNDAEL192-CBC | BLOWFISH-128-CBC |
| AES128-CBC | RIJNDAEL128-CBC | ARCFOUR-128 |

Message Integrity:

| HMAC-SHA1-160 | HMAC-SHA1-96 |
| HMAC-MD5-128 | HMAC-MD5-96 |

Authentication:
    Username/Password

Session Channel Break Extension (for RS232 Break)

# 4. Advanced Operations

## SNMP

The AmpMeter PDU family of products supports the Simple Network Management Protocol (SNMP).  This allows network management systems to use SNMP requests to retrieve information and control power for the individual outlets.

The AmpMeter PDU includes an SNMP v1 agent supporting standard MIB I and MIB II objects.

NOTE:  For security, SNMP support is disabled by default.

### SNMP Command Summary

| Command | Description |
| --- | --- |
| Set snmp | Enables or disables SNMP support |
| Set snmp getcomm | Sets the 'get' community string |
| Set snmp setcomm | Sets the 'set' community string |
| Set snmp trapdest1 | Sets a destination IP addresses for traps |
| Set snmp trapdest2 | Sets a destination IP addresses for traps |
| Set snmp traptime | Sets the delay for steady state condition traps |
| Show snmp | Displays all SNMP configuration information |

### Enabling and Setting up SNMP Support

AmpMeter PDU SNMP support must be enabled and configured for access to AmpMeter PDU3 MIB objects and generation of all AmpMeter PDU3 traps.

#### Enabling/disabling SNMP support

The AmpMeter PDU SNMP command is used to enable or disable SNMP support.

##### *To enable SNMP support:*

At the AmpMeter PDU: prompt, type **set snmp**, followed by **enabled** or **disabled** and press **Enter**.

NOTE:  A restart of the AmpMeter PDU is required after enabling or disabling SNMP support.  See *Performing a warm boot* on page 28 for more information.

#### Setting trap destinations

The Set SNMP Trapdest1 and Trapdest2 commands are used to set the IP addresses of SNMP management stations receiving all traps.  AmpMeter PDU supports a maximum of two trap destinations; one must be defined to enable trap generation.

##### *To set the trap destination:*

At the AmpMeter PDU: prompt, type **set snmp, trapdest1** or **trapdest2**, the Ipaddress and press **Enter**.

##### *Example*

The following sets the trap destination 1 to 64.42.31.208:

```
AmpMeter PDU: set snmp trapdest1 64.42.31.208<Enter>
```

##### *To reset the trap destination:*

At the AmpMeter PDU: prompt, type **set snmp, trapdest1** or **trapdest2, 0.0.0.0** and press **Enter**.

# 4. Advanced Operations

**Setting the trap timer**

The Set Traptime command sets the timer period between repeated error-condition traps.  The valid range for the timer period is 1 to 65535 (in seconds).
The default value for the timer period is 60 seconds.

*To set the trap timer:*

At the AmpMeter PDU: prompt, type **set traptime**, followed by the timer period and press **Enter**.

*Example*

The following sets the timer period to 180 seconds:

```
AmpMeter PDU: set traptime 180<Enter>
```

**Setting the Get/Set community strings**

AmpMeter PDU supports two SNMP community strings that provide varying levels of access to objects defined in the AmpMeter PDU3 MIB.

Community strings may be 1 to 24 characters.

**Setcomm**

The Setcomm string provides read-write access to AmpMeter PDU3 MIB objects.
The default Setcomm string is "private"

*To set the Setcomm community string:*

At the AmpMeter PDU: prompt, type **set snmp setcomm**, followed by the string and press **Enter**.

**Getcomm**

The Getcomm string provides read-only access to AmpMeter PDU3 MIB objects.
The default Getcomm string is "public".

*To set the Getcomm community string:*

At the AmpMeter PDU: prompt, type **set snmp getcomm**, followed by the string and press **Enter**.

**Setting the Trap community string**

The Set SNMP Trapcomm command is used to set the community string that is included with all generated traps.  This string must be defined to enable trap generation.

The trap community string may be 1 to 24 characters.
The default Trapcomm string is "trap".

*To set the Trapcomm community string:*

At the AmpMeter PDU: prompt, type **set snmp trapcomm**, followed by the string and press **Enter**.

# 4. Advanced Operations

**Displaying SNMP configuration information**

The Show SNMP command displays all SNMP configuration information.

- SNMP support status
- SNMP community strings
- Trap timer value
- Trap destinations

*To display SNMP configuration information:*

At the AmpMeter PDU: prompt, type **show snmp** and press **Enter**.

*Example*

The following command displays the SNMP configuration information:

```
AmpMeter PDU: show snmp<Enter>

   SNMP Configuration

    SNMP:                           Enabled
    SET Community String:           private
    GET Community String:           public
    TRAP Community String:          trap
    Error Trap Repeat Time (seconds): 180
    Trap Destination 1:             64.42.31.208
    Trap Destination 2:             (undefined)
```

## SNMP Traps

The AmpMeter PDU supports three types of SNMP traps.  Traps are enabled at the tower (T), infeed (I) or outlet (O) level.

### Trap Summary

| Name | Level(s) | Description |
| --- | --- | --- |
| Status | T, I, O | Operational status change |
| Change | O | Control status change |
| Load | I | Input load out of limit |

All traps include the Location of the AmpMeter PDU as defined with the Set Location command.  See *Creating a location description* on page 12 for more information.

**Status trap**

A Status trap is generated when an error condition occurs on a tower, infeed or outlet.  Status traps include the reported Status, the Location of the AmpMeter PDU, and identifier and name of the affected tower, infeed or outlet.

Any Trap Status generates a Status trap and triggers the trap timer.  A new trap is generated at the end of every timer period until the Status returns to a non-error status.

### Tower Status traps

| Status | Error | Description |
| --- | --- | --- |
| Normal | | Tower is working correctly |
| NoComm | x | Communication to the tower has been lost |

### Infeed Status traps

| Status | Error | Description |
| --- | --- | --- |
| On | | Infeed is on |
| OffError | x | Infeed should be on but no current is sensed at the infeed |
| NoComm | x | Communication to the infeed has been lost |

## Environmental Monitor Status traps

| Status | Error | Description |
|---|---|---|
| Normal | | The Environmental Monitor is working correctly |
| NoComm | x | Communication to the Environmental Monitor has been lost |

## Temperature/Humidity Sensor Status traps

| Status | Error | Description |
|---|---|---|
| Found | | The sensor has been detected |
| NotFound | | No sensor has been detected |
| Lost | x | Sensor initially detected but communication to the sensor has been lost |
| NoComm | x | Communication to the sensor has been lost |

NOTE: Traps are generated according to a hierarchical architecture; i.e. if a Tower Status enters a trap condition, only the Tower Status trap is generated. Infeed and Outlet Status traps are suppressed until the Tower Status returns to Normal.

### Change trap

The Change trap is generated for all outlet status changes between any on/off conditions. Change traps include the outlet status, Location of the AmpMeter PDU, and identifier and name of the affected outlet. For descriptions of the outlet status types, please refer to the prior table.

### Load Trap

The Load trap is generated whenever the total input load on an infeed exceeds a preset threshold. Load traps include the reported input load, load status, Location of the AmpMeter PDU, and identifier and name of the affected infeed.

Any error state generates a Load trap and triggers the trap timer. A new trap is generated at the end of every timer period until the Load returns to a non-error status.

## Load traps

| Status | Error | Description |
|---|---|---|
| Normal | | Infeed is on and within preset thresholds |
| NotOn | | Infeed is off |
| Reading | | Non-error state – Load status currently being read |
| LoadHigh | x | Infeed current load exceeds preset threshold |
| OverLoad | x | Infeed current load exceeds the measurable range for the infeed |
| ReadError | x | Unable to read Load status |
| NoComm | x | Communication to the infeed has been lost |

# 4. Advanced Operations

## Temp Trap

The Temp trap is generated whenever the temperature on a temperature/humidity sensor is beyond preset thresholds.  Temp traps include the reported temperature, temp status, Location of the AmpMeter PDU, and identifier and name of the affected sensor.

Any error state generates a Temp trap and triggers the trap timer.  A new trap is generated at the end of every timer period until the Temp returns to a non-error status.

### Temp traps

| Status | Error | Description |
|---|---|---|
| Normal | | The sensor is working correctly and the temperature is within preset thresholds |
| NotFound | | No sensor has been detected |
| Reading | | Temp status currently being read |
| TempLow | x | Temperature at the sensor below preset low threshold |
| TempHigh | x | Temperature at the sensor exceeds preset high threshold |
| ReadError | x | Unable to read Temp status |
| Lost | x | Sensor initially detected but communication to the sensor has been lost |
| NoComm | x | Communication to the sensor has been lost |

## Humidity Trap

The Humidity trap is generated whenever the umidity on a temperature/humidity sensor is beyond preset thresholds.  Humidity traps include the reported relative humidity, humidity status, Location of the AmpMeter PDU, and identifier and name of the affected sensor.

Any error state generates a Humidity trap and triggers the trap timer.  A new trap is generated at the end of every timer period until the Humidity returns to a non-error status.

### Humidity traps

| Status | Error | Description |
|---|---|---|
| Normal | | The sensor is working correctly and the relative humidity is within preset thresholds |
| NotFound | | No sensor has been detected |
| Reading | | Humidity status currently being read |
| HumidLow | x | Relative humidity at the sensor below preset low threshold |
| HumidHigh | x | Relative humidity at the sensor exceeds preset high threshold |
| ReadError | x | Unable to read Humidity status |
| Lost | x | Sensor initially detected but communication to the sensor has been lost |
| NoComm | x | Communication to the sensor has been lost |

# 4. Advanced Operations

## Configuring Traps

### SNMP Trap Command Summary

| Command | Description |
|---------|-------------|
| Set Trap EM Status | Enables or disables the Environmental Monitor Status trap |
| Set Trap THS Status | Enables or disables a temperature/humidity sensor Status trap |
| Set Trap THS Temp | Enables or disables a temperature/humidity sensor Temp trap |
| Set Trap THS Temphigh | Sets a temperature/humidity sensor Temp trap high limit |
| Set Trap THS Templow | Sets a temperature/humidity sensor Temp trap low limit |
| Set Trap THS Humid | Enables or disables a temperature/humidity sensor Humid trap |
| Set Trap THS Humidhigh | Sets a temperature/humidity sensor Humid trap high limit |
| Set Trap Tower Status | Enables or disables the Tower Status trap |
| Set Trap Infeed Status | Enables or disables the Infeed Status trap off |
| Set Trap Infeed Load | Enables or disables the Infeed Load trap |
| Set Trap Infeed HighThresh | Sets the Infeed Load trap high limit |
| Set Trap Outlet Change | Enables or disables the Outlet Change trap |
| Set Trap Outlet Status | Enables or disables the Outlet Status trap |
| Show Traps | Displays trap configurations |

### Enabling or Disabling a Status trap

The Set Trap … Status command is used to enable or disable Status traps for a Tower, Infeed, Outlet, Environmental Monitor or Sensor.

***To Enable or Disable a Status trap:***

At the AmpMeter PDU: prompt, type **set trap** (**tower**, **infeed, outlet, em** or **ths**) **status**, followed by the tower, infeed, outlet, Environmental Monitor or sensor name, and **on** or **off**.  Press **Enter**, or

Type **set trap** (**tower**, **infeed, outlet, em** or **ths**) **status all**, followed by **on** or **off** and press **Enter**.

***Examples***

The following command enables the Status trap for the first tower, using the tower's absolute name:

```
AmpMeter PDU: set trap tower status .a on<Enter>
```

The following command enables the Status trap for the tower named Florida_HQ_1:

```
AmpMeter PDU: set trap tower status Florida_HQ_1 on<Enter>
```

NOTE:  Enabling lower hierarchical traps automatically enables traps of higher hierarchical value: i.e. enabling an Outlet Status trap automatically enables the Infeed and Tower Status traps for that outlet.  Conversely, if a Tower Status trap is disabled, all associated Infeed Status & Load and Outlet Status traps will be disabled.

# 4. Advanced Operations

**Enabling or Disabling a Load trap**

The Set Trap Infeed Load command is used to enable or disable an Infeed Load trap.

*To Enable or Disable a Load trap:*

At the AmpMeter PDU: prompt, type **set trap infeed load**, followed by the infeed name, and **on** or **off**.  Press **Enter**, or

Type **set trap infeed load all**, followed by **on** or **off** and press **Enter**.

*Examples*

The following command enables the Load trap for second infeed on the first tower, using the infeed's absolute name:

```
AmpMeter PDU: set trap infeed load .AB on<Enter>
```

The following command disables the Load trap for all infeeds:

```
AmpMeter PDU: set trap infeed load all off<Enter>
```

NOTE:  Enabling lower hierarchical traps automatically enables traps of higher hierarchical value: i.e. enabling an Infeed Load trap automatically enables the Infeed and Tower Status traps for that infeed.

**Setting the Infeed Load limit**

The Set Trap Infeed Loadhigh command is used to set the upper load limits for an input feed.

*To set the infeed load limit:*

At the AmpMeter PDU: prompt, type **set trap infeed loadhigh**, followed by the infeed name, and a value from 0 to 255 in amperes. Press **Enter**.

*Example*

The following command sets the infeed load limit for the second infeed on the first tower to 25 amperes, using the infeed's absolute name:

```
AmpMeter PDU: set trap infeed loadhigh .ab 25<Enter>
```

**Enabling or Disabling a Change trap**

The Set Trap Outlet Change command is used to enable or disable an Outlet Change trap.

*To Enable or Disable a Change trap:*

At the AmpMeter PDU: prompt, type **set trap outlet change**, followed by the outlet name and **on** or **off**.  Press **Enter**, or

Type **set trap outlet change all**, followed by **on** or **off** and press **Enter**.

*Example*

The following command enables the Change trap for the third outlet on the first infeed of the second tower, using the outlet's absolute name:

```
AmpMeter PDU: set trap outlet change .ba3 on<Enter>
```

**Enabling or Disabling the Temp trap**

The Set Trap THS Temp command is used to enable or disable the Temp trap.

*To Enable or Disable the Temp trap:*

At the AmpMeter PDU: prompt, type **set trap ths temp**, followed by the sensor name and **on** or **off**. Press **Enter**.

*Example*

The following command enables the Temp trap for the first temperature-humidity sensor:

```
AmpMeter PDU: set trap ths temp .a1 on<Enter>
```

# 4. Advanced Operations

**Setting the Temperature sensor threshold limits**

The Set Trap THS Templow and Set Trap THS Temphigh commands are used to set the lower and upper threshold limits for the Temperature sensor.

***To set the Temperature threshold limits:***

At the AmpMeter PDU: prompt, type **set trap ths**, **templow** or **temphigh**, followed by the sensor name and a value from 0 to 127 in degrees Celsius. Press **Enter**.

***Example***

The following command sets the second temperature high threshold limit to 95:

```
AmpMeter PDU: set trap ths temphigh .a2 95<Enter>
```

**Enabling or Disabling the Humid trap**

The Set Trap THS Humid command is used to enable or disable the Humid trap.

***To Enable or Disable the Humid trap:***

At the AmpMeter PDU: prompt, type **set trap ths humid**, followed by the sensor name and **on** or **off**. Press **Enter**.

***Example***

The following command enables the Humid trap for the first temperature-humidity sensor:

```
AmpMeter PDU: set traps ths humid .a1 on<Enter>
```

**Setting the Humidity sensor threshold limits**

The Set Trap THS Humidlow and Set Trap THS Humidhigh commands are used to set the lower and upper threshold limits for the Humidity sensor.

***To set the Humidity threshold limits:***

At the AmpMeter PDU: prompt, type **set trap ths**, **humidlow** or **humidhigh**, followed by the sensor name and a value from 0 to 100 in percent relative humidity. Press **Enter**.

***Example***

The following command sets the first humidity sensor low threshold limit to 5:

```
AmpMeter PDU: set trap ths humidlow .a1 5<Enter>
```

# 4. Advanced Operations

**Displaying trap configuration information**

The Show Traps command displays information about all traps.

### To display trap information:

At the AmpMeter PDU: prompt, type **show traps** and press **Enter**.

### Example

The following command requests trap configuration information:

```
AmpMeter PDU: show traps <Enter>
Tower trap configuration:
   Tower    Tower                 Status
   ID       Name                  Trap
   .A       Florida_HQ_1          ON
   .B       Florida_HQ_2          ON
   More (Y/es N/o): y
Input feed trap configuration:
   Input    Input                 Status   Load    High
   Feed ID  Feed Name             Trap     Trap    Thresh
   .AA      HQ_1_Infeed_A         ON       ON      255 A
   .BA      HQ_2_Infeed_A         ON       ON      255 A
   More (Y/es N/o): y
Environmental Monitor .A trap configuration:
   Name: Florida_HQ_1
   Status Trap: ON
   Temperature/Humidity Sensor .A1     Temperature/Humidity Sensor .A2
      Name: Temp_Humid_Sensor_A1         Name: T/H2_Florida_HQ_1
      Status Trap: ON                    Status Trap: ON
       Temp Trap: ON                      Temp Trap: ON
           Low: 0   Deg.C                     Low: 0   Deg.C
          High: 127 Deg.C                    High: 95  Deg.C
      Humid Trap: ON                     Humid Trap: ON
           Low: 5   % RH                      Low: 0   % RH
          High: 100 % RH                     High: 100 % RH
```

# 5. Appendices

# 5. Appendices

## Resetting to Factory Defaults

You may reset the non-volatile RAM that stores all configurable options. This clears all administrator-editable fields and resets all command line configurable options to their default values, including all user accounts.

You may reset the unit to factory defaults from the command line or the HTML interface, or by pressing the reset button. You must have administrator-level privileges to issue the command. Using the reset button may be necessary when a forgotten password prevents administrator login. Each of the methods updates the current working configuration to the factory defaults.

NOTE: Resetting the unit resets all TCP/IP and Telnet/Web configurations. Reconfiguring the TCP/IP and Telnet/web settings will be required.

### To reset to factory defaults from the HTML interface

On the Restart page in the Tools section of the HTML interface, select **Restart and reset to factory defaults** from the drop-down menu and press **Apply**.

### To reset to factory defaults from the command line

At the AmpMeter PDU: prompt, type **restart factory** and press **Enter**.

### To reset to factory defaults using the reset button

Locate the recessed reset button directly beside the Serial & Ethernet ports. You will need a non-conductive, non-metallic tool that fits inside the recess.

Insert the tool in the recess, then depress and hold the reset button for at least ten seconds.

NOTE: If the reset button is depressed and held for more than 15 seconds, the reset will abort.

## Uploading Firmware

You may upload new versions of firmware using File Transfer Protocol (FTP). This allows access to new firmware releases for firmware improvements and new features additions.

NOTE: To begin an FTP upload session, you must first configure the FTP Host address, username/password, filename and filepath. For information on configuring the FTP settings required for firmware upload see *FTP Administration* on page 31.

You may initiate an FTP upload session by issuing a command or from the HTML interface. You must have administrator-level privileges to initiate an upload.

### To initiate an FTP upload session from the HTML interface

On the Restart page in the Tools section of the HTML interface, select **Restart and upload firmware via FTP** from the drop-down menu and press **Apply**.

Upon issuing this command the unit will restart and upload the firmware file specified with the FTP Filename command from the previously configured FTP Host. See See *FTP Administration* on page 31 for more information.

### To initiate an FTP upload session from the command line

The Restart FTPLoad command initiates an upload of firmware. Upon issuing this command the unit will restart and upload the firmware file specified with the FTP Filename command from the previously configured FTP Host. See *FTP Administration* on page 31 for more information.

To initiate an FTP firmware upload session:

At the AmpMeter PDU: prompt, type **restart ftpload** and press **Enter**.

## Technical Specifications

### Models

#### Europe/Asia

| Model | Voltage | Inlet Cordset and Plug (10') | Outlets |
|-------|---------|------------------------------|---------|
| RA12-2-C20 | 230V, 60Hz | IEC 60320/C20* | 12 IEC 60320/C13 |
| RA12-2-30932 | 230V, 60Hz | IEC 60309, 32A 3-pin 6Hr Blue | 12 IEC 60320/C13 |
| RA12-D2-30932M | 230V, 60Hz | IEC 60309, 32A 3-pin 6Hr Blue | 12 IEC 60320/C19 |
| RA24-2-30932 | 230V, 60Hz | IEC 60309, 32A 3-pin 6Hr Blue | 24 IEC 60320/C13 |
| RA48-D2-30932 | 230V, 60Hz | IEC 60309, 32A 3-pin 6Hr Blue | 48 IEC 60320/C13 |
| RA84-D2-30932M | 230V, 60Hz | IEC 60309, 32A 3-pin 6Hr Blue | 84 IEC 60320/C13 |

#### Americas

| Model | Voltage | Inlet Cordset and Plug (10') | Outlets |
|-------|---------|------------------------------|---------|
| RA12-1-L530 | 100-120V, 50/60Hz | NEMA L5-30P, 30A/120V locking | 12 NEMA 5-20R |
| RA12-D2-L630 | 208-240V, 50/60Hz | NEMA L6-30P, 30A/208V locking | 12 IEC 60320/C19 |
| RA12-2-C20 | 208-240V, 50/60Hz | IEC 60320/C20* | 12 IEC 60320/C13 |
| RA24-2-L630 | 208-240V, 50/60Hz | NEMA L6-30P, 30A/208V locking | 24 IEC 60320/C13 |
| RA48-D2-L630 | 208-240V, 50/60Hz | NEMA L6-30P, 30A/208V locking | 48 IEC 60320/C13 |
| RA84-D2-L630M | 208-240V, 50/60Hz | NEMA L6-30P, 30A/208V locking | 84 IEC 60320/C13 |

* Input cordset selected at time of purchase.

### Power Ratings

#### Europe/Asia

| Model / Modele / Modell | Input Current Ratings[1] L'indice du courant d'entrée Eingangsstromstärke | | Output Current Ratings L'indice du courant de sortie Ausgangsstromstärke | | | Phase[2] | Total |
|---|---|---|---|---|---|---|---|
| | Voltage Tension Spannung | Current Courant Strom | Voltage Tension Spannung | Outlet Prise Anschlussstelle | Branch Circuit Circuit de la Branche Zweigstromkreis | | Total Total Insgesamt |
| **230V 50/60Hz** | | | | | | | |
| RA12-2-C20 | 230V 50/60Hz | 16 | 230V 50/60Hz | 10 | 16 | | 16 |
| RA12-2-30932 | 230V 50/60Hz | 32 | 230V 50/60Hz | 10 | 20 | | 32 |
| RA12-D2-30932M | 230V 50/60Hz | A:32 B:32 | 230V 50/60Hz | 10 | 20 | | A:32 B:32 |
| RA24-2-30932 | 230V 50/60Hz | 32 | 230V 50/60Hz | 10 | 20 | | 32 |
| RA48-D2-30932 | 230V 50/60Hz | A:32 B:32 | 230V 50/60Hz | 10 | 20 | | A:32 B:32 |
| RA64-D2-30932M | 230V 50/60Hz | A:32 B:32 | 230V 50/60Hz | 10 | 20 | | A:32 B:32 |

[1] All current ratings are in amperes. *Tous les indices de courant sont en ampères.* Alle Angaben der Stromstärke erfolgen in Ampere.

[2] Each branch circuit or phase consists of: *Chaque circuit de la branche comporte:* Jeder Zweigstromkreis besteht aus:

| | |
|---|---|
| 12HDx - | 2 outlets, *prises,* Anschlüsse. Input, *Entrée,* Eingang A, B: 1+2, 3+4, 5+6 |
| 12Vx, 24VDx | One 6-outlet module; 6 outlets. *1 série de 6 prises de courants, soit au total 6 prises.* 1 gekuppelten Modulen mit je 6 Anschlüssen: 6 Anschlüsse. Input, *Entrée,* Eingang A, B: 1a, 2a, 3a |
| 24Vx, 48VDx | Two 6-outlet module; 12 outlets. *2 série de 6 prises de courants, soit au total 12 prises.* 2 gekuppelten Modulen mit je 6 Anschlüssen: 12 Anschlüsse. Input, *Entrée,* Eingang A, B: 1a+1b, 2a+3b, 3a+3b |
| 84VDx | Two 7-outlet module; 14 outlets. *2 série de 7 prises de courants, soit au total 14 prises.* 2 gekuppelten Modulen mit je 7 Anschlüssen: 14 Anschlüsse. Input, *Entrée,* Eingang A, B: 1a+1b, 2a+3b, 3a+3b |

# 5. Appendices

## Americas

| Model | Input Current Ratings [1] *L'indice du courant d'entrée* Eingangsstromstärke | | Output Current Ratings *L'indice du courant de sortie* Ausgangsstromstärke | | | | |
| | Voltage | Current | Voltage | Outlet | Branch Circuit | Phase [2] | Total |
| *Modele* | *Tension* | *Courant* | *Tension* | *Prise* | *Circuit de la Branche* | | *Total* |
| Modell | Spannung | Strom | Spannung | Anschlussstelle | Zweigstromkreis | | Insgesamt |
| **100-120V 50/60Hz** | | | | | | | |
| RA12-1-L530 | 100-120V 50/60Hz | 24 | 100-120V 50/60Hz | 16 | 16 | | 24 |
| **208-240 60Hz** | | | | | | | |
| RA12-D2-L630 | 208-240V 60Hz | A:24 B:24 | 208-240V 60Hz | 12 | 16 | | A:24 B:24 |
| RA12-2-C20 | 208-240V 60Hz | 16 | 208-240V 60Hz | 12 | 16 | | 16 |
| RA24-2-L630 | 208-240V 60Hz | 24 | 208-240V 60Hz | 12 | 16 | | 24 |
| RA48-D2-L630 | 208-240V 60Hz | A:24 B:24 | 208-240V 60Hz | 12 | 16 | | A:24 B:24 |
| RA84-D2-L630M | 208-240V 60Hz | A:24 B:24 | 208-240V 60Hz | 12 | 16 | | A:24 B:24 |

[1] All current ratings are in amperes. *Tous les indices de courant sont en ampères.* Alle Angaben der Stromstärke erfolgen in Ampere.

[2] Each branch circuit or phase consists of: *Chaque circuit de la branche comporte:* Jeder Zweigstromkreis besteht aus:

| | |
| 12HDx - | 2 outlets, *prises,* Anschlüsse. Input, *Entrée*, Eingang A, B: 1+2, 3+4, 5+6 |
| 12Vx, 24VDx | One 6-outlet module; 6 outlets. *1 série de 6 prises de courants, soit au total 6 prises.* 1 gekuppelten Modulen mit je 6 Anschlüssen: 6 Anschlüsse.  Input, *Entrée*, Eingang A, B: 1a, 2a, 3a |
| 24Vx, 48VDx | Two 6-outlet module; 12 outlets. *2 série de 6 prises de courants, soit au total 12 prises.* 2 gekuppelten Modulen mit je 6 Anschlüssen: 12 Anschlüsse.  Input, *Entrée*, Eingang A, B: 1a+1b, 2a+3b, 3a+3b |
| 84VDx | Two 7-outlet module; 14 outlets. *2 série de 7 prises de courants, soit au total 14 prises.* 2 gekuppelten Modulen mit je 7 Anschlüssen: 14 Anschlüsse.  Input, *Entrée*, Eingang A, B: 1a+1b, 2a+3b, 3a+3b |

## Physical Specifications

| | Operating | Storage |
|---|---|---|
| **Temperature** | 32° to 122° F   (0° to 50° C) | -40° to 185° F   (-40° to 85° C) |
| **Elevation** (above MSL) | 0 to 10,000 ft   (0 to 3000m) | 0 to 50,000 ft   (0 to 15000m) |
| **Relative Humidity** | 10 to 90%, non-condensing | 10 to 90%, non-condensing |

| | **Dimensions** (H x W x D) | | **Weight** | |
|---|---|---|---|---|
| RA12-1 | 31.25 x 1.75 x 2.25 | (794 x 45 x 57 mm) | 7.4 lbs | (16 kg) |
| RA12-2 | 31.25 x 1.75 x 2.25 | (794 x 45 x 57 mm) | 7.4 lbs | (16 kg) |
| RA12-D2 | 3.5 x 17.0 x 10.0 in. | (89 x 437 x 178 mm) | 17 lbs | (37 kg) |
| RA24-2 | 63.5 x 1.75 x 2.25 in. | (1617 x 45 x 57 mm) | 10 lbs | (22 kg) |
| RA48-D2 | 63.5 x 3.5 x 2.25 in. | (1617 x 89 x 57 mm) | 17.4 lbs | (38 kg) |
| RA84-D2 | 66.0 x 3.5 x 2.25 in. | (1678 x 89 x 57 mm) | 24 lbs | (53 kg) |

# 5. Appendices

## Data Connections

### RS-232 port

The AmpMeter PDU may be equipped standard with an RJ45 DTE RS-232c serial port. This connector may be used for direct local access or from other serial devices such as a terminal server. An RJ45 crossover cable is provided for connection to an RJ45 DCE serial port.

| Pin | DTE Signal Name | | Input/Output |
|-----|-----------------|------|--------------|
| 1 | Request to Send | RTS | Output |
| 2 | Data Terminal Ready | DTR | Output |
| 3 | Transmit Data | TD | Output |
| 4 | Signal Ground | | |
| 5 | Signal Ground | | |
| 6 | Receive Data | RD | Input |
| 7 | Data Set Ready | DSR | Input |
| 8 | Clear to Send | CTS | Input |

87654321
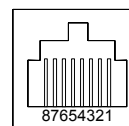
### RJ45 to DB9F serial port adapter

An RJ45 to DB9F serial port adapter may be provided for use in conjunction with the RJ45 crossover cable to connect to a PC DB9M DCE serial port. The adapter pinouts below reflect use of the adapter with the provided RJ45 crossover cable.

| Pin | DCE Signal Name | | Input/Output |
|-----|-----------------|------|--------------|
| 1 | | | |
| 2 | Receive Data | RD | Output |
| 3 | Transmit Data | TD | Input |
| 4 | Data Terminal Ready | DTR | Input |
| 5 | Signal Ground | | |
| 6 | Data Set Ready | DSR | Output |
| 7 | Request to Send | RTS | Input |
| 8 | Clear to Send | CTS | Output |

5 4 3 2 1
9 8 7 6
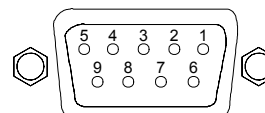
## Branch Circuit Protection

Always disconnect the power supply cord before opening to avoid electrical shock.
Afin d'éviter les chocs électriques, débranchez le cable électrique avant d'ouvrir.
Immer Netzleitung auskuppeln vor den Aufmachen um elektrischen Schlag zu vermeiden.

Cabinet Distribution Units feature Branch Circuit protection on all outlets in the form of internal fuses. These fuses meet the strict safety requirements of UL/CSA 60950-1 for Branch Circuit Protection.

### Time-Delay Fuses – Class G

| Amperes | Bussman Part Number |
|---------|---------------------|
| 20 | SC-20 |

*CooperBussman product data-sheet #1024*